INSTITUTE	**FACULTY OF TECHNOLOGY**
PROGRAM	**BACHELOR OF TECHNOLOGY (CIVIL ENGINEERING)**
SEMESTER	**6**
COURSE TITLE	**GEOGRAPHIC INFORMATION SYSTEM**
COURSE CODE	**01CI0623**
COURSE CREDITS	**4**

Objective:

1. To analyze data science and geospatial analytic skills for the investigation of civil engineering problems.
2. To base Civil Engineering projects on Geo-Spatial technologies in order to make better decisions.
3. To understand modern trend in application of GIS in Civil Engineering domain.
4. To apply management techniques in order to maintain project integration management

Course Outcomes: After completion of this course, student will be able to:

1. Describe the key components and subsystems of GIS.
2. Analyze and differentiate between various spatial data models and manage attribute data with DBMS.
3. Plan and manage a GIS project, including system scope, database design, and quality control.
4. Apply modern GIS techniques for analysis and visualization.
5. Evaluate modern GIS techniques with various tools like ArcGIS/QGIS

Pre-requisite of course:NA

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	0	2	50	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	**Introduction** Introduction, Definitions, Key components, GIS- A Knowledge hub, GIS- A Set of Interrelated Sub systems, Origin of GIS, Function & Advantages of GIS, Limitation of GIS	6

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Contents : Unit	Topics	Contact Hours
2	**GIS and Data Science** Spatial Data Model: Introduction, Spatial & Thematic dimensions of Geographic data, Spatial Entity and Object, Spatial Data models such as Conceptual Data Model, Logical Data Model, Object Oriented Data Models., Raster Data Model: Field based Raster Models, Object based Raster Model, Vector Data Model: Field based Vector Models, Object based Vector Model , Raster Versus Vector data model, File formats for Spatial Data., Attribute Data Management: Introduction, Concept of database and DBMS, Advantage and Function of DBMS, Data Models in GIS	14
3	**Planning, Implementation and management of GIS** Planning of Project: Strategic Purpose, Plan for planning, Understanding of Technological requirements, Defining System scope and designing of database, Analyzing benefit and Costs, Implementation of Project: Procurement of Hardware and Software, Organization of Project Team, Training & Execution of Project, Quality Control & Checking, Project meeting and reporting, Management of Project: Schedule Management, Cost management, Quality Management, Contract Scope & Risk Management, Project Integration Managements, Keys for Successful GIS, Reasons for unsuccessful GIS	10
4	**Modern Trends of GIS** DEM analysis, Analytical modeling in GIS, GIS interfaces, GIS post-processing, dynamic visualization, Decision making, Introduction to ArcGIS / QGIS Desktop GIS - Exploring for spatial and non-spatial data operations, analysis and management.	12
Total Hours		**42**

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	**Practical-1** Soil Geospatial data mapping and management	8
2	**Practical-2** Land Use/Cover Geospatial data mapping and management	8
3	**Practical-3** Site selection for major infrastructure with geospatial data	6
4	**Practical-4** Natural disaster mitigation with geospatial data	6
Total Hours		**28**

Textbook :

1 Geographical Information System, Ian Heywood et al., Pearson, 2019

2 Concepts and Techniques of Geographical Information Systems, Lo C.P. and Yeung Albert K.W., Prentice-Hall of India Pvt. Ltd. New Delhi, 2006

Textbook :

3 Principles of Geographic Information Systems, Principles of Geographic Information Systems, Oxford university press, 1998

4 Geographical Information Systems, Stan Aronoff, WDL Publications, Ottawa, Canada, 1989

References:

1 Remote Sensing and GIS, Remote Sensing and GIS, Bhatta B, Oxford University Press, New Delhi, 2008

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery					
Remember / Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Higher order Thinking / Creative**
10.00	20.00	30.00	30.00	5.00	5.00

Instructional Method:

1 At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.

2 Lectures will be taken in class room with the use of multi-media presentations, white board– mix of both

3 Attendance is compulsory in lectures and laboratory which carries a 5% component of the overall evaluation

4 Minimum two internal exams will be conducted and average of two will be considered as a part of 15% overall evaluation

5 Assignments based on course content will be given to the students at the end of each unit/topic and will be evaluated at regular interval. It carries a weightage of 5%.

6 Surprise tests/Quizzes will be conducted which carries 5% component of the overall evaluation

Supplementary Resources:

1 www.ermapper.com

2 https://qgis.org/en/site/forusers/download.html

3 https://srtm.csi.cgiar.org/

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